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to settle that point the writer wishes now to call attention to a *Uromyces* which is undoubtedly distinct from either *U. acuminatus* or *U. Spartinae*. Its distinctive characters are the brownish or purplish spots which are produced about the sori and the few equatorial pores of the urediniospores. Neither *U. acuminatus* nor *U. Spartinae* produces such spots and both have numerous scattered pores. The new form comes from southern Florida and may be characterized thus:

***Uromyces argutus* sp. nov.**—O and I. Pycnia and aecia unknown.

II. Uredinia amphigenous, scattered, on rather large brownish or purplish spots, linear, 1–4 mm. long, rather tardily naked, slightly pulverulent, cinnamon-brown; urediniospores broadly ellipsoid,  $19-23 \times 25-32\mu$ , the wall rather thick,  $2-3\mu$ , light cinnamon-brown, finely echinulate; pores 3, occasionally 4, approximately equatorial.

III. Telia amphigenous, scattered, sometimes on discolored spots like the uredinia, linear, 1–2 mm. long, rather tardily naked, pulvinate, blackish; teliospores ellipsoid or obovoid,  $16-19 \times 24-32\mu$ , usually narrowed both above and below, the wall dark chestnut-brown,  $1.5-2\mu$  thick, much thickened at apex,  $7-10\mu$ , smooth; pedicel tinted, about twice length of spore.

Type collected at Miami, Florida, on *Spartina glabra* Muhl., March 25, 1903, *E. W. D. Holway*.

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## REVIEWS

### Duggar's Plant Physiology\*

Professor Duggar's "Plant Physiology" occupies a zone of tension between pure and applied science, and it is not easy to do the book entire justice in a review, owing in part to the fact that it is quite unlike anything else we have, and the reviewer has continually to adjust his orientation. It seems to the writer that the book would be less liable to misinterpretation if the title by which it was announced in advance, "The Physiology of Plant Production," had been retained on the title-page. As

\* Duggar, Benjamin M. Plant Physiology, With special reference to plant production. Pp. i-xv+1-516, frontispiece and figs. 1-144. New York. The Macmillan Co. 1911. Price \$1.60.

a college text-book on plant physiology it would be quite inadequate, but as text on the physiology of plant (crop) production it is a distinct success. The point of view of the entire book may be inferred from the statement on page 495, where, in discussing growth movements, the author says: "A study of the phenomena is more important educationally in liberalizing our views of plant relations than of any direct assistance in special problems of plant production."

At various points throughout the text one queries as to whether or not the student is expected to have had a college course in elementary botany. If so, much of the pure physiology of the book will be of the nature of a review to him, except in so far as he follows out the admirable suggestions for collateral reading, given at the close of each chapter. If an elementary course is not taken for granted, then one may question the possibility of the reader understanding a discussion of proteoses and peptones, amides, Leguminosae, degradation products, amino and amido acids (p. 261), and "the curve of  $\text{CO}_2$  excretion" (p. 287). In like manner the quotation on pages 309-310, from Coulter and Chamberlin, seems much too technical.

In discussing the relation of pruning to growth (p. 236), there is no reference to the very pertinent topic of the self-pruning of many trees; and the large amount of experimental work that has been done, in this country and in Europe, on the effects of the electric current in soil and air, on crop-production, and the very considerable literature that exists on the subject would seem to merit at least a passing reference in a book of this scope.

On page 69 turgor is attributed to hydrostatic pressure, though on page 67 osmotic pressure is correctly said to vary "with the number of particles in the solute." Growth is held to involve differentiation (pp. 307-308), thus taking no account of a fundamental distinction quite commonly held elsewhere, and especially necessary to recognize for many lower plants. In the first table on page 431 the meaning of the figures and of the column-headings is not obvious; the character  $\mu$ , used in the table at the bottom of page 423, is nowhere explained in the book; and in the table on page 405 it is not clear what units of time are referred to.

The definition of adsorption, on page 440, restricts it to the reduction of toxicity by solid particles.

In Chapter XVI, on "The Temperature Relation," the importance of the length of the growing season (the period between the last killing frost of spring and the first one of autumn) is not emphasized. All temperatures are given in degrees Centigrade, and no reference is made to Professor Abbe's work of 1905.

The statement on page 468 that "great diversity of opinion prevails with regard to the magnitude [*sic*] of the variations by means of which progress in selection is maintained," tends, in the light of the preceding paragraph, to perpetuate the error that the difference between mutation and fluctuation is one of degree; and the assertion on page 469, that "Many deny permanence to this type of selection" (of fluctuating variations in sugar-beets) seems quite too mild, in view of recent work.

On page 474 it is stated that "the extreme supporters of the mutation principle . . . actually exclude the possibility of any such phenomenon as transmissible fluctuation," yet de Vries, himself, has said\* that "The answer to the question whether acquired characters are inherited, is that they are not so in their entirety, but with a reduction, the amount of which is indicated by Galton's law"; and he later calls attention to the fact that if there were no inheritance of fluctuating variation, the improvement of horticultural races would not be possible.

The laboratory directions at the end of each chapter are well adjusted to the text, and especially so to the class of students for whom they are intended. One wonders, though, how many hours of credit should be allowed the poor "Agric." who is required (p. 378) to "make a careful count of the number of blossoms produced" by an apple tree! A number of investigators would be glad to learn how to determine "the moment of wilting" of a plant (p. 62); and a knowledge on the part of the student of the precautions necessary in order to weigh a number of slightly wilted leaves "accurately upon a delicate balance" (p. 63) can hardly be taken for granted. On pages 223 and 224

\* De Vries, Hugo. The Mutation Theory. Eng. Translation. Vol. II, p. 136. 1911.

it is implied that starch-accumulation is synonymous with photosynthesis. A paragraph on page 433 is headed "Etiolation," but this term is not referred to or defined in the paragraph nor elsewhere in the book, nor does it occur in the index.

At numerous places the literary style and the English are such as to suggest that the text might have been dictated and not subsequently revised with sufficient care. Thus we find "this element" (p. 195), without any element being previously referred to in the paragraph; "The strong flavor of radishes . . . are also modified" (p. 426); "It is not always possible to distinguish positively between the two types, or the movement may be the result of conjoint stimulus" (p. 495).

However, the fact that it was so easy to single out the above points only means that the book is one of conspicuous merit. Since Johnson's "How Crops Grow" and "How Crops Feed," nothing of similar nature has appeared, and Professor Duggar has rendered distinct service in bringing forward in concrete form, with a carefully worked out solution, the whole question of a suitable presentation of plant physiology to agricultural students. Especially has the author made a very happy choice in the topics selected and excluded, and the book cannot help but conduce to clearer thinking, and a more intelligent practice on the part of the student and reader.

The text has distinct vitality because so much of it comes direct from the author at first hand, the illustrations are apt, and the book is sure to meet with the wide and warm welcome which it justly merits.

C. STUART GAGER

#### TAYLOR'S REVIEW OF THE PHYTOGEOGRAPHIC SURVEY OF NORTH AMERICA: A REPLY

The long and detailed review of my recent book in *TORREYA* covering ten pages of the September, 1911, number of the journal is a surprising one, because the mark of a true critic is to give the other man the benefit of a doubt. Some of the points taken by Taylor in his review are justly made, but many of them are